WEST

End of Result Set

Generate Collection Print

L4: Entry 2 of 2 File: USPT Jun 15, 1999

DOCUMENT-IDENTIFIER: US 5911687 A
TITLE: Wide area medical information system and method using thereof

Brief Summary Text (7):
Furthermore, remote examination and treatment services in which a plurality of medical facilities which are located far from each other are connected and information regarding patients including image information is sent and received has been tried experimentally. A medical image transmission system having an image transmission means and reception means for that purpose is disclosed in Japanese Laid-Open Patent Application No. 2-218336 (Prior art 3).

Detailed Description Text (14):
FIG. 3 shows a constitution example of the doctor side 102 constituting the clinic. A file server 301, a reception terminal with TV-phone 302, an accounting terminal 303, a clinic (order) terminal 304, and a high resolution display for image display 305 are connected via a branch network 300 connected to the wide area network 100. The file server 301 has an accounting file 306 and a care record file 307 for storing treatment history information of patients under care who are examined via the network and the reception terminal with TV-phone has a list file for reserved patients under care 308. Each doctor of the clinic receives registration and appointments for examination and treatment from patient's via the reception terminal installed with TV-phone 302.

Detailed Description Text (20):
The integrated management server 501 has an accounting file 509. The inspecting system 504 has an inspection result file 511. Furthermore, the radiograph photo-taking subsystem has an image file 512.

Detailed Description Text (29):
S703: The management center side 104 searches the electronic hospital doctor database 604 on the file server 601 from the reception terminal 602 and searches for a doctor in charge for each clinic section under the search condition of case history and desire of the patient. An example of the content of the database 604 is shown in FIG. 10 and it comprises information including the doctor's name, place of registration, section, specialty, history, and others.

Detailed Description Text (77):
S1105: The doctor refers to the case record data of the patient and the image data. Specifically, the doctor refers to the past medicine history and inspection history of the patient and displays the inspection data on the clinic terminal 304 and the image data on the high resolution display 305.

Detailed Description Text (78):
S1106: The doctor executes various image processes such as gradation conversion, filtering, and others on the high resolution display 305 and reads images.

Detailed Description Text (79):
S1107: As a result of query and reference to the image data, the doctor gives a diagnosis and explains the result for the patient.

Detailed Description Text (80):
S1108: The doctor inputs the image read report and doctor's diagnosis to the case record data.

Detailed Description Text (86):

S1115: Various processes, radiography, etc. corresponding to the order contents of the doctor are executed for the patient. The image data imaged by the radiograph photo-taking system 505 is stored in the image file 512 in the subsystem once.

Detailed Description Text (87):
S1116: The image data of the patient is transferred to the integrated management server 501 from the image file 512 and to the management center 104 via the wide area network.

Detailed Description Text (88):
S1117: The management center 104 preserves the image data sent from the treatment station 105 in the record file for patients in local area 603 together with the case record of the patient.

Detailed Description Text (89):
By doing this, the latest image data for the next treatment can be used.

Detailed Description Text (95):
S1205: The doctor refers to the case record data and the image data. Specifically, the doctor refers to the past medicine history and examination history of the patient and displays the examination data on the clinic terminal 304 and the image data on the high resolution display 305.

Detailed Description Text (96):
S1206: The doctor executes various image processes such as gradation conversion, filtering, and others on the high resolution display 305 and reads images.

Detailed Description Text (97):
S1207: As a result of query and reference to the image data, the doctor gives a diagnosis of an incurable disease. If this occurs, the doctor notifies the management center 104 immediately and requests an access right to the case database 606 on the integrated management server 601. The management center 104 receiving it gives the access right to the case database 606 to the doctor immediately.

Detailed Description Text (111):
FIG. 19 shows the internal structure of the case database 606 of the present invention. The database comprises a database for case retrieval 1401 and databases for various results such as inspection and radiographic image (a database for test result 1402 and a database for radiographic image 1403). Data is downloaded to the case record file for patients under care 307 on the file server 301 on the patient side 102 from the management center 104 via the wide area network 100.

Brief Summary Text (15):
The first action a physician generally takes upon meeting a new patient is to try and identify the patient's medical condition or problem. Until the medical problem is identified, the medical problem can not be attacked. There are many diagnostic instrumentalities, sometimes called modalities, to aid the physician in identification of the patient's medical problem. These modalities include X-Ray, EKG, EEG, MRI, CT, NM, PET, blood tests, microscope images, etc. Each of these modalities produces a characteristic "diagnostic medical image." Often, a diagnostic provider (physician) tries to analyze, or read, the diagnostic medical image as a means of helping the gatekeeper physician arrive at a diagnosis of the patient's problems. The gatekeeper then uses this to determine a course of action. It could be said that "the better the diagnosis the better the health care."

Brief Summary Text (18):
Moreover, the medical profession, in many areas has not kept pace with and taken advantage of technological improvements, notwithstanding the critical need therefor. For example, storage and retrieval systems for medical image data such as X-ray films, CAT scans, angiograms, tomograms, and MRI studies are commonly antiquated and often employ methods made popular in the 1920's. Image films used by most diagnostic physicians are still displayed on an antiquated light box.

Brief Summary Text (21):
U.S. Pat. No. 5,321,520, which is incorporated herein by reference for all purposes, discloses an automated high definition/resolution image storage, retrieval and transmission system for use in hospitals capable of storing, transmitting and displaying medical diagnostic quality images for use with medical X-ray films or the like. As shown in FIG. 1, the system disclosed by the '520 patent includes components for processing the image data from patient imaging to physician usage. FIG. 1 illustrates an automated high definition/resolution image storage, retrieval and transmission system 10 for use with medical X-ray film 12. System 10 includes an image scanning and digitizing means 14 to transform the visual image from the medical X-ray film 12 or other documents into digital data, an image data storage and retrieval means 16 to store and selectively transfer digital data upon request, a telecommunication means 18 to selectively receive digital data from the image data storage and retrieval means 16 for transmission to one of a plurality of remote visual display terminals each indicated as 20 upon request from the respective remote visual display terminal 20 through a corresponding communications network 21 such as a telephone line, satellite link, cable network or local area network such as Ethernet or an ISDN service for conversion to a visual image for display at the remote requesting site.

Brief Summary Text (31):
Remote access to the image storage and retrieval subsystem may be provided by a variety of telecommunication links. By using several CD disk drives and electronic buffering, virtually simultaneous access can be granted to several or more users. However, the medical image disk will contain relatively huge quantities of data making it impractical to send over conventional data communication links without very efficient data compression technology.

Brief Summary Text (37):
The Radiology Healthcare Network disclosed in U.S. Pat. No. 5,469,353 provides high quality, timely medical interpretations of radiological images on a national (e.g., across the U.S.) and regional basis. The images can include images created by conventional x-ray technology, computed radiography, magnetic resonance imaging (MRI), computed tomography (CT), ultrasound imaging, nuclear medicine, and mammography equipment. The network includes the acquisition of these images from health care facilities, the conversion of these images to digital format, the routing of these converted images, the interpretation of these routed images, and the routing of the interpretations back to the originating facility. The images are routed (e.g., on a variety of high-speed digital and analog telecommunication networks) to the appropriate interpretation resource by an administrative site on the Network based on one or more requirements associated with the medical image study. The interpretation can be performed on high-resolution workstations and/or on films produced by film printers. The Network includes quality control measures which assure high image and interpretation quality. The control and tracking of images by the administrative site results in the production of a complete, signed interpretive report in a timely manner. See FIG. 2.

Brief Summary Text (38):

From the discussion above, it will be recognized that the current medical image distribution technology has the following problems and limitations:

Brief Summary Text (39):
(1) Diagnostic physicians are often restricted to the local geographical vicinity of the patient/gatekeeper who requests the medical image to be made and read. This is particularly true of traditional radiology services, but is also true of existing teleradiology services. As noted in U.S. Pat. No. 5,469,353, the diagnostic physician assigned by the administrator is the one nearest to the point where the medical image was generated. It will be appreciated this is often counterproductive, since the diagnostic physician best able to perform the reading may be on the other side of the country. For example, the victim of a car crash at 6 AM in California can take advantage of a large pool of idle radiologists already at work at 9 AM along the entire east coast.

Brief Summary Text (56):
It is desirable that a remote access medical image exchange system include the following major features:

Brief Summary Text (60):
(4) a combination of hardware and software to enhance the medical images by both contrast enhancement and zooming for improved diagnostics;

Brief Summary Text (61):
(5) software and corresponding hardware permitting the patient/gatekeeper to quickly ascertain the time by which the medical image reading will be completed and, if necessary, reschedule the reading of the medical image;

Brief Summary Text (62):
(6) software and corresponding hardware permitting the patient/gatekeeper to direct the medical image to a particular diagnostic physician of choice; and

Brief Summary Text (63):
(7) software and corresponding hardware permitting the patient/gatekeeper to direct the medical image to a particular diagnostic physician or group of diagnostic physicians having a particular specialty.

Brief Summary Text (64):
In other words, it is desirable to have a remote access medical image exchange method by which the patient/gatekeeper can set a price for an individual diagnostic service, and by which the diagnostic provider can use price to decide whether to accept the offer.

Brief Summary Text (65):
What is needed is a system and operating method therefor to permit bidding for the unused time of diagnostic physicians by patients who do not need real time medical image diagnosis, and/or to permit diagnostic physicians to bid on available work, and thereby provide an electronic marketplace for diagnostic services. What is also needed is a system and corresponding operating method which permits the patient/gatekeeper to designate a particular diagnostic physician to perform a particular diagnosis. It will be appreciated that these requirements are critical to efforts to increase the quality of health care while limiting the cost of health care delivery services.

Brief Summary Text (67):
Based on the above and foregoing, it can be appreciated that there presently exists a need in the art for a remote access medical image exchange system which overcomes the above-described deficiencies. The present invention was motivated by a desire to overcome the drawbacks and shortcomings of the presently available technology, and thereby fulfill this need in the art. In order to address these issues, the present invention will be discussed with respect to modern telecommunications and computer technology. However, it must be clearly understood that telemedicine is not the essence of the present invention. In fact, although the Remote Access Medical Image eXchange (RAMIX) moves images from one place to another, even that is not the essence of this invention. The essence of the invention is the use of a decentralized, i.e., self-organizing, distribution system combined with bid queues to establish a market place which allows for continuously negotiated prices with control (over who reads the images, when they are read and what the fee will be for such a reading) being totally in the hands of the patient/gatekeeper and the diagnostic physician.

Brief Summary Text (75):
These and other objects, features and advantages according to the present invention are provided by a storage medium for storing computer readable instructions for permitting a computer to store a plurality of electronic medical images corresponding to respective first users, to arrange the electronic medical images in an order established by the electronic labeling of the electronic medical images, and to download one of the electronic medical images to a requesting one of a plurality of second users based on this order.

Brief Summary Text (76):
These and other objects, features and advantages according to the present invention are provided by a storage medium for storing computer readable instructions for permitting a computer to store a plurality of first electronic medical images corresponding to respective first users, to store a plurality of second electronic medical images corresponding to respective second users, to arrange the first electronic medical images in a first order established by all of the first users, to arrange the second electronic medical images in a second order established by all of the second users, to download one of the first electronic medical images to any requesting one of a plurality of third users based on the order established by the first users, and to download one of the second electronic medical images to one of the third users selected by one of the second users.

Brief Summary Text (78):
a first record medium for storing computer readable instructions for permitting a first computer to store a plurality of first electronic medical images corresponding to respective first users, to store a plurality of second electronic medical images corresponding to respective second users, to arrange the first electronic medical images in a first order established by all of the first users, to arrange the second electronic medical images in a second order established by all of the second users, to download one of the first electronic medical images to any requesting one of a plurality of third users based on the order established by the first users, and to download one of the second electronic medical images to one of the third users selected by one of the second users;

Brief Summary Text (79):
a second record medium for storing computer readable instructions for permitting a second computer to generate the first and second electronic medical images and to upload the first and second medical images to the first computer;

Brief Summary Text (80):
a third record medium for storing machine readable instructions for permitting a third computer to monitor a relative position of a selected one of the first and second electronic medical images and for instructing the first computer to move the selected one of the first and second electronic medical images to a new position in one of the orders established by the first and the second users; and

Brief Summary Text (81):
a fourth record medium for storing computer readable instructions for permitting a fourth computer to download the requested one of the first and the second electronic medical images.

Brief Summary Text (82):
These and other objects, features and advantages according to the present invention are provided by a system for transmitting, storing, retransmitting and receiving a plurality of electronic medical images, each containing an indicia of the priority attached to one of the electronic medical images by a respective patient, the system comprising first through fourth computer systems. Preferably, the first computer system includes an associated scanning device for generating the electronic medical images, the second computer system includes an electronic medical image storage memory for storing the electronic medical images in a predetermined order based on the indicia in the respective electronic medical images, the third computer system includes a first display for displaying the selected one of the electronic medical images, and the fourth computer system includes a second display for monitoring all of the electronic medical images, and an input device for changing one of the indicia in a selected one of the electronic medical images.

Brief Summary Text (83):
According to one aspect of the present invention, the second computer system reorders all stored electronic medical images responsive to the change of any one of the indicia

associated with the electronic medical images. According to another aspect of the present invention, the second computer system is operatively connected to the first, third and fourth computer systems by dedicated communications channels.

Brief Summary Text (84):
According to still another aspect of the invention, two communications channels connect the second and third computer systems, a low speed communications channel for instructing the second computer system to download the selected one of the electronic medical images to the third computer system, and a high speed communications channel for downloading the selected one of the electronic medical images from the second computer system to the third computer system.

Brief Summary Text (85):
These and other objects, features and advantages according to the present invention are provided by a method for operating a computer system including a buffer memory storing a plurality of electronic medical images awaiting diagnosis by a diagnostic physician, each of the electronic medical images having an associated priority indicia assigned by a respective user. Preferably, the method includes steps for:

Brief Summary Text (86):
monitoring a rate of change of position of the patient's electronic medical image relative to the plurality of electronic medical images;

Brief Summary Text (88):
when the velocity is unacceptable to the patient, changing the priority indicia in the patient's electronic medical image so as to instruct the computer system to reorder the plurality of electronic medical images based on the priority indicia and thereby generate an improved time of reading of the patient's electronic medical image.

Brief Summary Text (89):
These and other objects, features and advantages according to the present invention are provided by a method for operating a computer system including a first buffer memory storing a plurality of first electronic medical images awaiting diagnosis by one of a plurality of diagnostic physicians and a second buffer memory storing a plurality of second electronic medical images awaiting diagnosis by a selected diagnostic physician, each of the electronic medical images having an associated priority indicia assigned by a respective user. Advantageously, the method includes steps for:

Brief Summary Text (90):
storing a patient's electronic medical image among a selected one of the first and second electronic medical images,

Brief Summary Text (91):
monitoring a rate of change of position of the patient's electronic medical image relative to the selected one of the first and second electronic medical images to thereby determine velocity through one of the first and second buffer memories, and

Brief Summary Text (92):
when the velocity is unacceptable to the patient, changing the priority indicia in the patient's electronic medical image so as to instruct the computer system to reorder the selected one of the first and second electronic medical images based on the priority indicia and thereby increase the velocity of the patient's electronic medical image through the selected one of the first and second buffer memories.

Brief Summary Text (93):
These and other objects, features and advantages according to the present invention are provided by a remote access medical image exchange system including a first facility for converting a plurality of physical medical images into corresponding digital medical images and for storing the digital medical images in a remotely accessible data storage device, to thereby provide a remotely accessible electronic digital medical image database comprised of the stored digital medical images, and a second facility remote from the first facility, but in electronic communication therewith, for providing a diagnostic service provider with access to the electronic digital medical image database, wherein the system is configured in such a manner as to enable the diagnostic service provider to select one or more of the digital medical images from the database for reading, at the discretion of the diagnostic service provider.

Brief Summary Text (94):
These and other objects, features and advantages according to the present invention are

provided by a remote access medical image exchange system, including a first facility for converting a plurality of physical medical images for respective patients into corresponding digital medical images and for storing the digital medical images in a remotely accessible data storage device, to thereby provide a remotely accessible electronic digital medical image database comprised of the stored digital medical images, and a plurality of second facilities remote from the first facility, but in electronic communication therewith, for providing a pool of participating diagnostic service providers with access to the electronic digital medical image database, wherein the system is configured in such a manner as to enable any one or more of the diagnostic service providers to select one or more of the digital medical images from the database for reading, in accordance with selection criteria established by the diagnostic service providers and the patients.

Brief Summary Text (95):
According to one aspect of the present invention, the system also includes a device for facilitating interactive bidding by the patients and diagnostic service providers regarding the fees to be charged by the participating diagnostic service providers for the reading of one or more of the digital medical images from the database, whereby the system functions as an open electronic marketplace for the reading of digital medical images.

Brief Summary Text (96):
These and other objects, features and advantages according to the present invention are provided by a method for facilitating remote reading of medical images, including the steps of:

Brief Summary Text (97):
converting a plurality of physical medical images for respective patients into corresponding digital medical images;

Brief Summary Text (98):
storing the digital medical images in a remotely accessible data storage device, to thereby provide a remotely accessible electronic digital medical image database comprised of the stored digital medical images;

Brief Summary Text (99):
providing a pool of participating diagnostic service providers with access to the electronic digital medical image database; and

Brief Summary Text (100):
wherein any one or more of the diagnostic service providers can select one or more of the digital medical images from the database for reading, in accordance with selection criteria established by the diagnostic service providers and the patients.

Brief Summary Text (101):
These and other objects, features and advantages according to the present invention are provided by a remote access medical image exchange system, including a first facility for converting a plurality of physical medical images into corresponding digital medical images and for storing the digital medical images in a remotely accessible data storage device, to thereby provide a remotely accessible electronic digital medical image database comprised of the stored digital medical images, and a second facility remote from the first facility, but in electronic communication therewith, for providing a diagnostic service provider with access to the electronic digital medical image database. Preferably, the system is configured in such a manner as to enable the diagnostic service provider to arbitrarily select one or more of the digital medical images from the database for reading, at the discretion of the diagnostic service provider.

Brief Summary Text (102):
These and other objects, features and advantages according to the present invention are provided by a remote access medical image exchange system, including a first facility for converting a plurality of physical medical images for respective patients into corresponding digital medical images and for storing the digital medical images in a remotely accessible data storage device, to thereby provide a remotely accessible electronic digital medical image database comprised of the stored digital medical images, and a plurality of second facilities remote from the first facility, but in electronic communication therewith, for providing a pool of participating diagnostic service providers with access to the electronic digital medical image database. According to one aspect of the present invention, the system is configured in such a

manner as to enable any one or more of the diagnostic service providers to select one or more of the digital medical images from the database for reading, in accordance with selection criteria established by the diagnostic service providers and the patients.

Brief Summary Text (103):
These and other objects, features and advantages according to the present invention are provided by a method for facilitating remote reading of medical images. Advantageously, the method includes steps for:

Brief Summary Text (104):
converting a plurality of physical medical images for respective patients into corresponding digital medical images;

Brief Summary Text (105):
storing the digital medical images in a remotely accessible data storage device, to thereby provide a remotely accessible electronic digital medical image database comprised of the stored digital medical images; and

Brief Summary Text (106):
providing a pool of participating diagnostic service providers with access to the electronic digital medical image database.

Brief Summary Text (107):
According to one aspect of the present invention, any one or more of the diagnostic service providers can select one or more of the digital medical images from the database for reading, in accordance with selection criteria established by the diagnostic service providers and the patients.

Brief Summary Text (108):
These and other objects, features and advantages according to the present invention are provided by a method for operating a computer system including a buffer memory storing a plurality of electronic medical images awaiting diagnosis by a diagnostic physician, each of the electronic medical images having an associated priority indicia assigned by a respective user. Preferably, the method includes steps for:

Brief Summary Text (109):
monitoring a rate of change of position of the patient's electronic medical image relative to the plurality of electronic medical images;

Brief Summary Text (111):
when the velocity is unacceptable to the patient, changing the priority indicia in the patient's electronic medical image so as to instruct the computer system to reorder the plurality of electronic medical images based on the priority indicia and thereby increase the velocity of the patient's electronic medical image.

Drawing Description Text (3):
FIG. 1 is a high level block diagram of a conventional diagnostic medical image system;

Drawing Description Text (5):
FIG. 3 is a high level representational block diagram of a system for distributing diagnostic medical images according to the present invention;

Detailed Description Text (2):
As discussed in detail above, the major problems with the current diagnostic health care delivery system are that it is overpriced and inefficient. Moreover, it is run by people who don't have the patient's or the provider's best interest at heart. The overall result of the current diagnostic health care delivery system is that, at best, it does no real harm to the patient and, at worst, leaves the patient in poorer health after a course of treatment (or non-treatment) dictated by a poor diagnosis. Needless to say, the inefficiencies are financially detrimental to all concerned. The Remote Access Medical Image eXchange (RAMIX.TM.) system and operating method therefor addresses and overcomes every one of the above-listed problems.

Detailed Description Text (5):
Advantageously, the RAMIX operating method according to the present invention starts by having digitized patient images sent to a Clearinghouse Computer (CHC). It will be appreciated that the CHC (200) advantageously can be a mainframe computer or a dedicated server. The image is then placed in one of two separate and different markets

areas, so-called Patient Bid Queues (PBQs) and Provider Mail Boxes (PMBs). Preferably, the choice between PBQ and PMB is controlled solely by the patient/gatekeeper physician. Diagnostic physicians advantageously can access both the PBQ and PMB and examine the contents of each before deciding if they want to do a reading. If they do, the diagnostic physician downloads the image(s) and begins the diagnosis. Advantageously, the patient/gatekeeper and the diagnostic physician preferably decide which diagnostic physician is going to do the reading and how much the diagnostic physician is paid for this reading. The RAMIX system acts only as a forum which allows transactions or interactions between the patient/gatekeeper and the diagnostic physician to occur.

Detailed Description Text (6):
Beneficially, the invention is based on two facts, namely, the fact that the typical diagnostic physician has one or more periods of downtime in the course of a normal day and the fact that most patients require reasonable time readings and not real time readings. More specifically, it is estimated that a diagnostic physician can be without medical images to read 25-30 percent of the time. Considering that radiologists average somewhere between $225,000 and $450,000 a year, this is extremely inefficient. Additionally, the vast majority of diagnostic images need to be read in a reasonable time, not real time.

Detailed Description Text (12):
(4) The RAMIX system according to the present invention provides a specialized bid mechanism, which is based on ordered sets of queues for individual bid amounts. The system and corresponding operation method allow patients to barter with the entire diagnostic physician community as a whole while, at the same time, providing diagnostic physicians the means to survey the entire pool (database) of images that require reading at any given moment.

Detailed Description Text (13):
(5) The RAMIX system and corresponding methods of operation permit constant monitoring of the image's progress through either the PBQs or the PMBs by the patient/gatekeeper. Preferably, the patient/gatekeeper, when connected to the RAMIX system, can monitor how fast his/her image is moving through the queue chosen by the patient/gatekeeper. The patient/gatekeeper then has the option to change the selected queue and, therefore, the bid price the patient/gatekeeper is willing to pay for the reading. This permits the patient/gatekeeper to adjust the velocity of the medical image through the RAMI system so as to enable an earlier completion time for the reading more to the patient/gatekeepers liking. In essence, the ability to reselect the PBQ or position in the PMB where the medical image of interest resides allows for continuous negotiating of the bid price for the reading service. It should be mentioned that the reselected position could establish a lower priority, i.e., bid price, if the patient/gatekeeper determines that the medical image is moving through the selected PBQ too rapidly. For example, if the patient is scheduled for a consultation in three days, the patient/gatekeeper may select or reselect a PBQ which has an average two day velocity, i.e., a medical image placed in that particular PBQ will probably be read in 48 hours of less, so that the reading will be completed before the consultation with the gatekeeper and at the lowest possible price.

Detailed Description Text (14):
(6) Within the RAMI Clearing House Computer are located Patient Bid Queues (PBQs), which contain a pointer or link to patient electronic medical images. Each PBQ has an associated bid that all of the patients in that PBQ are willing to pay the diagnostic physician to have their medical image read. Preferably, PBQs are arranged in descending order at increments, e.g., 5%, of the average price that the patient/gatekeeper is willing to pay for the reading. In an exemplary case where the average price for a reading is $100, the PBQs would be established indicating prices of $120, $115, $110, $105, $100, $95, $90, $85, $80, etc. Within any particular PBQ, the images are arranged in "First In, First Out" (FIFO) order, i.e., time of receipt order. Note that the patient with the highest bid amount, and who is at the top of the FIFO order, is guaranteed to get his image read by the next diagnostic provider who is willing to do the reading for that amount, while the first diagnostic physician who decides to do a reading from this array, is guaranteed that the RAMIX software will download the image with the highest bid to him/her.

Detailed Description Text (15):
It should be noted that there could be an array of PBQs, for each additional criteria such as medical subspecialty and/or modality. For example, all EMR's for neurological MRI's advantageously can be put together into an array of queues as described above. In

addition, there could also be another array of queues for all EMR's of CT's, and so on. Diagnostic providers are free to look into any of these arrays which they are qualified to read from. For example, PBQs may be established using both price and an additional criteria to form a matrix of PBQs. For example, different columns advantageously can be established for head, chest, and extremities with each row of a particular column being assigned a set price. It should also be mentioned that each row of the matrix need not reflect an uniform bid price; preferably, each row corresponds to a standard percentage change of the average price.

Detailed Description Text (17):
(7) The RAMIX system and operating method according to the present invention advantageously would include Physician Mail Boxes, which stores links, i.e., pointers, to electronic medical images (EMIs) arranged in fee amount order, i.e., the fee amount that each patient agrees to pay the particular diagnostic physician for his/her reading. It will be recognized that the very nature of the RAMIX system of the present invention includes no provisions obligating a patient to send an image to a particular provider. Moreover, under the inventive system and operating method, no diagnostic physician is guaranteed that images will be sent to him and no diagnostic physician is obligated to perform any readings even if medical images are specifically sent to him. Each PMB will contain arrays of queues just as the PBQ area does, but only the specified diagnostic provider will be able to enter it and download images.

Detailed Description Text (19):
(9) According to one aspect of the present invention, the RAMIX system and operating method therefor permits the patient to negotiate with a pool of "just in time physicians". More specifically, if at any given moment the patient's bid is the highest in all of the PBQs, that patient is guaranteed that the next available diagnostic physician will address his/her image. That is, the patient is only negotiating with those providers who are free to do a reading at that particular moment and all diagnostic physicians in that "available" group are competing with each other to do the reading; thus the patient is virtually guaranteed that once the medial image is selected, the medical image will be read quickly. One of the particular advantages of the present invention is that there is no need for a functionary at a central administration location to decide which diagnostic physician has the time to do that particular reading; the diagnostic physicians do that themselves.

Detailed Description Text (20):
(10) According to another aspect of the present invention, the RAMIX system and corresponding operating method advantageously provides "just in time" medical images. As discussed above, 30% of any diagnostic physician's time is wasted during the day because the diagnostic physician has no images to read. This problem of 30% diagnostic physician downtime is exacerbated by the fact that the downtime comes in small units, e.g., 15 minutes of downtime. Moreover, the diagnostic physician cannot predict when the downtime will occur. The RAMIX system and operating method of the present invention were motivated by a desire to address this problem. Preferably, the RAMIX system addresses the problem by the combination of pooled patient medical images, and a decentralized distribution system. Moreover, the RAMIX system advantageously provides high bandwidth downlinks to the diagnostic physician performing the reading. It should be noted that the pooling preferably is accomplished through the PBQs and the pooling is possible because only "reasonable or just in time" readings are usually required, not "real time" readings. This results in images being presented to the diagnostic physician exactly at the time the diagnostic physician reaches an idle point in his/her day, i.e., "just in time" medical images.

Detailed Description Text (21):
At this point it should also be mentioned that a secondary advantage of the RAMI system according to the present invention is that it encourages efficiency on the part of the diagnostic physician. As a radiologist goes through his/her day, knowing that RAMIX is there will cause him to work more efficiently. Heretofore, the diagnostic physician knew that there were only so many images that he/she would be required to read during a typical day; thus, there was no reason for the diagnostic physician to be efficient. Now there is. Once the diagnostic physician is finished with a locally generated reading, the diagnostic physician can select and download a medical image from the RAMIX system.

Detailed Description Text (22):
(11) Hyper-specialization among diagnostic physicians is another aspect according to the present invention. Hyper-specialization occurs for two reasons. First, the diagnosing physician can restrict those allowed to place images in his/her mail box to

the specialty that he/she wants. Second, each diagnostic physician advantageously can look over the Patient Bid Queues and pick from them medical images in his/her speciality area. Basically, this allows each diagnostic physician to increase his/her patient base. It should be mentioned that hyper-specialization also can lead to the creation of diagnostic physician "stars"; thus, a radiologist who is truly gifted at his/her work can demand a certain fee that he/she would not normally be able to get.

Detailed Description Text (23):
(12) Another advantageous result of the RAMIX system and associated method of operation is that it complements the existing practice of many diagnostic physicians. Moreover, because diagnostic physicians are under no obligation to do readings, the system does not inflict itself on an existing practice. Each individual physician, and only the physician, decides when he/she would like to perform a diagnostic reading on a medical image placed on the RAMIX system. The RAMIX system beneficially complements the diagnostic physician's existing practice and allows the diagnosing physician to work more efficiently.

Detailed Description Text (25):
Referring first to FIG. 3, the RAMIX system 100 according to the present invention includes a clearing house computer (CHC) 200, which advantageously receives, stores and downloads medical images requiring diagnostic readings and receives, stores and transmits reports regarding diagnostic readings performed on medical images. Preferably, the CHC 200 is a distributed computer network with redundant transmission and storage capabilities; the CHC 200 advantageously can be a server in a large scale intranet. Other hardware configurations are possible so long as the functions described below can all be performed.

Detailed Description Text (26):
Preferably, the CHC 200 is connected to a imaging center 300, which center advantageously includes, in an exemplary case, a scanner 320 which is connected to CHC 200 via a computer 310 and a communications channel 210. It should be mentioned that the scanner 320 and computer 310 depicted in FIG. 3 are exemplary only. The system disclosed in U.S. Pat. No. 5,321,520 advantageously can be used to convert conventional x-rays into EMIs on a much larger scale. It should also be mentioned that many conventional devices which produce an electronic medical image (EMI) as an output develop the medical image in digital form and then print the image as a hard copy. For example, U.S. Pat. No. 4,603,254, which patent is incorporated herein by reference for all purposes, discloses a stimulable phosphor sheet carrying a radiation image stored therein which is scanned with stimulating rays, i.e., a laser beam, to develop the stored image. The amount of light emitted from the stimulable phosphor sheet is proportional to the amount of radiation energy stored therein. The emitted light is detected and converted into an electric signal, which is subsequently converted into a digital data signal. The digital data is then used in creating a radiation image on film for use in diagnosis and subsequent storage. It should be noted that although U.S. Pat. No.4,603,254 was discussed in U.S. Pat. No. 5,321,520, the latter patent did not appreciate that the scanner could be dispensed with when an EMI can be generated without use of an intermediate hard copy. This advantageously reduces degradation in the EMI transmitted to CHC 200. In short, while the imaging center 300 necessarily generates the EMI transferred to CHC 200, many variations of the hardware located at imaging center 300 are possible and all variations fall with the scope of the present invention.

Detailed Description Text (32):
The computer 510 in the gatekeeper's office 500, as well as the computer 310 at the imaging center 300, include specialized software for connecting to the CHC 200. The software contains an electronic medical form (EMF), which is filled out by the patient/gatekeeper. All of the necessary medical information is entered into the EMF, with all information being entered in "fields" which can be used to track and control the reading process, as discussed in greater detail below. Preferably, the EMF can include the Acquisition Site Identification Number, Gatekeeper Identification Number and a Patient Identification Number. The operating software turns the EMF is into a computer file and electronically attaches the digitized "diagnostic medical image" to the form. The entire computer file thus becomes the patient's Electronic Medical Record (EMR). Finally, a Document Control Number (DCN) is assigned to the patient's EMR, which advantageously allows the patient/gatekeeper, the diagnostic physician performing the reading, and the operating system of the CHC 200 to follow (track) and access the EMR as it moves through the RAMIX system. Preferably, security measures e.g., passwords, are implemented to maintain the privacy of the patient's EMR. It will also be recognized the DCN advantageously may include identifiers to indicate such things as

the acquiring modality and subspecialty within the modality, to all system users.

Detailed Description Text (34):
As shown in FIG. 5, the display of computer 510 includes four distinct areas 512, 514, 516 and 518. Preferably, area 512 is reserved for patient data such as the form ordering the needed procedure while area 514 displays information regarding the PBQs and PMBs. In addition, area 516 is dedicated to messages such as the diagnosis performed by the diagnostic physician, which will be discussed in greater detail below. Area 516 on the screen of computer 510 advantageously may also be used to display biographical information on diagnostic physicians to the patient/gatekeeper. Beneficially, screen area 518 allows the patient/gate-keeper to view a low resolution version of the medical image, or a high resolution of the pertinent parts of the EMR, once the diagnostic physician's reading has been performed. It should also be mentioned that the relative sizes of areas 512, 514, 516 and 518 are for illustrative purposes only. Moreover, while the areas, which are generated by graphical user interface (GUI) software, could be resized for various tasks or according to physician preferences, preferably the areas have a predetermined size and arrangement so that the gatekeeper can readily grasp the displayed information.

Detailed Description Text (42):
(5) An estimate by the RAMIX system as to approximately when a reading would normally occur based on where the patient might place his/her medical image; and

Detailed Description Text (43):
(6) Detailed Biographies of all reading providers. This information is provided to the patient/gatekeeper via the computer 510 from CHC 200, preferably in area 514 of the computer's screen. It should be mentioned that once the image has been sent to the RAMIX system, the patient/gatekeeper may order his/her image moved to a different queue. In order to facilitate this decision, the patient/gatekeeper advantageously has access to the information noted above, as well as the current position in the queue of the patient's image, and the information regarding movement through the selected queue, as discussed in greater detail below.

Detailed Description Text (44):
Advantageously, the patient/gatekeeper makes use of all of the above-mentioned information available to him in deciding which is the best choice, PBQs or PMBs, for bidding on the reading of his/her medical image. Preferably, one or more of the following variables can be taken into consideration when the selection is made:

Detailed Description Text (50):
As discussed briefly above, there are two types of locations where a patient/gatekeeper can place a medical image for reading: Patient Bid Queues (PBQs); and Provider Mail Boxes (PMBs). Together these locations create a forum or marketplace for electronic medical images and provider services, allowing patients to bid for provider services while allowing diagnostic physicians to compete with one another to provide the diagnostic services desired by the patients. With the preferred embodiment of the system and method of the present invention, negotiating is performed anonymously, not one-on-one between a single patient and a particular provider, although this possibility is not excluded. In other words, according to the system and corresponding method of the present invention, any negotiating is done en masse, not face-to-face between a particular patient and a particular provider. Which PBQ or PMB a medical image is placed in is strictly up to the patient and his/her gatekeeper physician; the RAMIX system is no more involved in this selection than the phone company is involved in selecting the telephone calls the patient makes. Of course, it will be appreciated that the RAMIX system does not permit connections to diagnostic physicians who are not subscribers.

Detailed Description Text (51):
As previously mentioned, Provider Mail Boxes (PMBs) allow patients to bid against one another for a particular diagnostic physician's time. Each reading physician is assigned his/her own Mail Box, which will contain, at any one time, a listing of all of the patients who are specifically requesting that the diagnostic physician diagnose their medical image. Within the RAMIX system, the PBM is divided into different subdirectories based on the amounts that the patients are willing to pay for the reading of their respective medical images. The patient image is listed under the amount that they are willing to pay on a FIFO basis. An exemplary arrangement of subdirectories labeled with bid prices is show in Table 1. It should be noted that a similar array could appear for each modality.

Detailed Description Text (54):
When the patient/gatekeeper requests that a particular diagnostic provider perform the reading, the patient's EMI advantageously contains both the PMB address and an amount the patient is willing to pay for the diagnostic service. Advantageously, the patient/gatekeeper can also specify such things as the time limit for doing the reading and an alternative diagnostic physician so that, in the event that the primary diagnostic physician cannot or will not complete the patient's reading before the time expires, the patient's EMR is transferred to the PMB of a secondary diagnostic physician. As will be discussed in greater detail below, once the medical image has been sent to the CHC 200, the software operating the CHC 200 will enter the EMR into the physician's mail box and reprioritize all EMRs according to the bid amounts offered for the services. Once the physician logs on to the RAMIX system, he/she can enter his/her personal PMB using a security code, and look over the directory of EMR labels identifying medical images that are waiting to be read. The diagnostic physician will determine whether to read or reject any particular image. Moreover, the diagnostic physician alone decides what fees he/she will accept or reject for his/her reading. It will be appreciated that for those physicians who are truly gifted in the profession the demand for their diagnostic services will be high and, thus, they can justifiably charge higher amounts for their services, according to the basic law of supply and demand in a free and open marketplace. It should also be mentioned that the RAMIX system places no restrictions on how fast the medical images must be read, unlike those in the patient bid queues.

Detailed Description Text (55):
It should also be recognized that the above configuration of the PMB is an exemplary arrangement; other arrangements are possible. For example, all medical images sent to a particular physician's mail box advantageously may be shown in a consolidated listing sorted on the bid price offered for the reading and the date-time the EMR containing the EMI is received by the CHC 200, as shown in greater detail in FIG. 6. It will be appreciated from FIG. 6 that the actual medical records advantageously can be stored in a buffer memory such as a redundant array of inexpensive drives (RAID) buffer memory or an optical memory such as an optical juke box. Preferably, the contents of the PBQs and PMBs are pointers, links or shortcuts to the actual EMRs containing the respective EMIs, which preferably are stored in RAID memory within or attached to CHC 200.

Detailed Description Text (56):
In contrast, PBQs allow diagnostic providers to compete with one another for the privilege of performing EMI readings. As discussed above, the patient/gatekeeper advantageously can choose to place the medical image on the "open market," i.e., so that the EMI will be addressed by the diagnostic physician community as a whole. It will also be noted that in this situation, the choice of diagnostic physician is relinquished in return for the opportunity to have the reading performed during what otherwise would be the diagnostic physician's average 30% downtime. Advantageously, even though the medical image is being placed in one of the PBQs, quality is maintained by virtue of the fact that all providers connecting to the CHC 200 preferably are Board Certified diagnosticians in their particular field.

Detailed Description Text (59):
It should again be mentioned that the above configuration of the PBQs is an exemplary arrangement; other arrangements are possible. For example, all medical images sent to the PBQs advantageously may be shown in a consolidated listing sorted on the bid price offered for the reading and the date-time the EMI is received by the CHC 200, as shown in greater detail in FIG. 6. As mentioned previously, the actual EMRs advantageously can be stored in a buffer memory such a redundant array of inexpensive drives (RAID) buffer memory or an optical memory such as an optical juke box; the contents of the PBQs and PMBs can be pointers, links or shortcuts to the actual EMRs containing the EMIs to be read, which advantageously can be stored in a RAID memory within or attached to CHC 200.

Detailed Description Text (69):
Once the EMR with it's included EMI is received by CHC 200, the computer's operating system stores the EMR in the EMR Storage area and searches the stored EMR for the particular field which contains the information specifying the location where the patient's EMR is to be entered, i.e., either into one of the PBQs or one of the PMBs. The operating software of the CHC 200 then places the Document Control Number corresponding to the patient's EMR in the appropriate Patient Bid Queue (PBQ) or Provider Mail Box (PMB). The operating program then advances to step 604.

Detailed Description Text (88):

Another interesting alternative method for operating the RAMIX system according to the present invention is the so-called open market direct bid method of operation. In an exemplary case, the patient transmits his/her EMR to CHC 200 via comm channel 210 as a work order the patient would like to receive bids on. The diagnostic physicians currently experiencing downtime would then bid against one another for the privilege of performing the reading. Advantageously, a time limit is established, e.g., one hour, and during that time diagnostic physicians would bid on performing the reading. At the end of the predetermined time period, the diagnostic physician with the lowest bid would be awarded the reading. It should be mentioned that with this particular method of operating the RAMIX system, the diagnostic physicians bidding for a particular reading would be bidding for an EMI which could be read during the next down period that occurs after the bidding closes. It should also be mentioned that the bids need not be restricted to monetary amounts. Patients are free to establish other criteria for the successful bidder such as: how fast the reading must be done; the type of subspecialty the diagnostic physician must have, etc. All of these factors and more advantageously could go into evaluating the bids and determining the successful bidder. It will noted that the RAMIX system performs the evaluation according to the criteria established by the patient/gatekeeper.

Other Reference Publication (2):
Seshadri, Sridhar B. et al. "Design of a Medical Image Management System: a Practical Cost-effective Approach." Computer Methods and Programs in Biomedicine, vol. 25, 1987, pp. 185-192.

CLAIMS:

2. The buffer memory as recited in claim 1, wherein said digital information blocks are electronic medical images.

4. A storage medium for storing computer readable instructions for permitting a computer to store a plurality of electronic medical images corresponding to respective first users, to arrange said electronic medical images in a bid price order established by all of said first users, and to download one of said electronic medical images to a requesting one of a plurality of second users based on the bid price order established by said first users.

7. A storage medium for storing computer readable instructions for permitting a computer to store a plurality of first electronic medical images corresponding to respective first users, to store a plurality of second electronic medical images corresponding to respective second users, to arrange said first electronic medical images in a first order established by all of said first users, to arrange said second electronic medical images in a second order established by all of said second users, to download one of said first electronic medical images to any requesting one of a plurality of third users based on the order established by said first users, and to download one of said second electronic medical images to one of said third users selected by one of said second users.

8. The storage medium as recited in claim 7, wherein said storage medium stores computer readable instructions for instructing the computer to store said first electronic medical images in a plurality of queues, each of said queues storing respective ones of said first electronic medical images having a respective predetermined indicia of the priority assigned by each of said first users.

9. The storage medium as recited in claim 7, wherein said storage medium stores computer readable instructions for instructing the computer to permit said first users to become said second users, and vice versa, until a selected one of said first and said second electronic medical images is downloaded by one of said third users.

10. A combination comprising:

a first record medium for storing computer readable instructions for permitting a first computer to store a plurality of first electronic medical images corresponding to respective first users, to store a plurality of second electronic medical images corresponding to respective second users, to arrange said first electronic medical images in a first order established by all of said first users, to arrange said second electronic medical images in a second order established by all of said second users, to download one of said first electronic medical images to any requesting one of a plurality of third users based on the order established by said first users, and to download one of said second electronic medical images to one of said third users

selected by one of said second users;

a second record medium for storing computer readable instruction for permitting a second computer to generate said first and said second electronic medical images;

a third record medium for storing machine readable instructions for permitting a third computer to monitor a relative position of a selected one of said first and second electronic medical images and for instructing said first computer to move said selected one of said first and second electronic medical images to a new position in one of the orders established by said first and said second users; and

a fourth record medium for storing computer readable instructions for permitting a fourth computer to download said requested one of said first and said second electronic medical images.

12. The combination as recited in claim 10, wherein said first and said second electronic medical images are digitized x-rays.

13. The combination as recited in claim 10, wherein said first and said second electronic medical images each include an indicia of the priority a respective one of said first and said second users attaches to processing of respective first and second electronic medical images by said third users.

14. The combination as recited in claim 13, wherein said machine readable instructions for instructing said first computer to move said selected one of said first and second electronic medical images to a new position in one of the orders established by said first and second users comprises changing said indicia in said first and said second electronic medical images.

15. The combination as recited in claim 10, wherein said instructions in said fourth storage medium permit said selected electronic medical image to be displayed on said fourth computer.

16. A system for transmitting, storing, retransmitting and receiving a plurality of electronic medical images, each containing an indicia of the priority attached to one of the electronic medical images by a respective patient, said system comprising:

a first computer system including:

a first memory storing a first software module containing first operating instructions readable by said first computer system; and

a scanning device for generating the electronic medical images;

a first communications channel receiving said electronic medical images from said first computer system;

a second computer system receiving the electronic medical images from said first communications channel, said second computer system including:

a second memory storing a second software module containing second operating instructions readable by said second computer system;

an electronic medical image storage memory for storing links to the electronic medical images in a predetermined order based on the indicia in the respective electronic medical images; and

a second communications channel for receiving a selected one of the electronic medical images from said second memory;

a third computer system for selecting said selected one of the electronic medical images and for receiving said selected one of said electronic medical images, said third computer comprising:

a third memory storing a third software module containing third operation instructions readable by said third computer; and

a first display for displaying said selected one of the electronic medical images;

a third communications channel; and

a fourth computer system operatively coupled to said second computer system by said third communications channel, said fourth computer system comprising:

a second display for monitoring all of said electronic medical images; and

an input device for changing one of the indicia in a respective one of the electronic medical images;

wherein said second computer system, under control of said second operating instructions, reorders all of said links to the stored electronic medical images responsive to the change of any one of the indicia of the electronic medical images.

17. The system as recited in claim 16, wherein said second communications channel comprises:

a low speed communications channel for instructing said second computer system to download the selected one of the electronic medical images to said third computer system; and

a high speed communications channel for downloading said selected one of the electronic medical images from said second computer system to said third computer system.

18. The system as recited in claim 16, wherein said third computer system comprises a plurality of third computers, and wherein said electronic medical image storage memory comprises a first electronic medical image storage memory accessible by all of said third computers and a second electronic medical image storage memory having a plurality of partitions, each of said partitions being accessible by only a selected one of said third computers.

20. A method for operating a computer system including a buffer memory storing a plurality of electronic medical images awaiting diagnosis by a diagnostic physician, each of the electronic medical images having an associated priority indicia assigned by a respective user, said method comprising steps for:

storing a patient's electronic medical image among the plurality of electronic medical images;

monitoring a rate of change of position of the patient's electronic medical image relative to the plurality of electronic medical images to thereby determine velocity through the buffer memory to the diagnostic physician; and

when said velocity is unacceptable to the patient, changing the priority indicia in the patient's electronic medical image so as to instruct the computer system to reorder the plurality of electronic medical images based on the priority indicia and thereby adjust the velocity of the patient's electronic medical image through the buffer memory.

22. The method as recited in claim 20, further comprising the step for downloading the one of the electronic medical images having the highest priority to the diagnostic physician.

23. A method for operating a computer system including a first buffer memory storing a plurality of first electronic medical images awaiting diagnosis by one of a plurality of diagnostic physicians and a second buffer memory storing a plurality of second electronic medical images awaiting diagnosis by a selected diagnostic physician, each of the electronic medical images having an associated priority indicia assigned by a respective user, said method comprising steps for:

storing a patient's electronic medical image among a selected one of the first and second electronic medical images;

monitoring a rate of change of position of the patient's electronic medical image relative to the selected one of the first and second electronic medical images to thereby determine velocity through one of the first and second buffer memories; and

when said velocity is unacceptable to the patient, changing the priority indicia in the patient's electronic medical image so as to instruct the computer system to reorder the selected one of the first and second electronic medical images based on the priority

indicia and thereby adjust the velocity of the patient's electronic medical image through the selected one of the first and second buffer memories.

24. The method as recited in claim 23, wherein changing the priority indicia permits transfer of the patient's electronic medical image from the first buffer memory to the second buffer memory, and vice versa.

25. A remote access medical image exchange system, comprising:

a first facility for converting a plurality of physical medical images for respective patients into corresponding digital medical images and for storing the digital medical images in a remotely accessible data storage device, to thereby provide a remotely accessible electronic digital medical image database comprised of the stored digital medical images;

a plurality of second facilities remote from the first facility, but in electronic communication therewith, for providing a pool of participating diagnostic service providers with access to the electronic digital medical image database; and,

wherein the system is configured in such a manner as to enable any one or more of the diagnostic service providers to select one or more of the digital medical images from the database for reading, in accordance with selection criteria established by one of the diagnostic service providers and the patients.

26. The system as set forth in claim 25, wherein the selection criteria include estimated time of reading and price.

27. The system as set forth in claim 25, wherein the selection criteria include diagnostic service provider capability and availability.

28. The system as set forth in claim 26, wherein the selection criteria further include diagnostic service provider capability and availability.

29. The system as set forth in claim 25, wherein the system is configured in such a manner as to enable any one or more of the diagnostic service providers to select one or more of the digital medical images from the database for reading at any time which they choose.

31. The system as set forth in claim 25, further comprising means for facilitating interactive bidding by the patients and diagnostic service providers regarding the fees to be charged by the participating diagnostic service providers for the reading of one or more of the digital medical images from the database, whereby the system functions as an open electronic marketplace for the reading of digital medical images.

32. The system as set forth in claim 25, further comprising means for facilitating competitive bidding by the diagnostic service providers for the reading of at least some of the digital medical images stored in the database.

34. The system as set forth in claim 33, further comprising means for providing the patients access to pricing information for the reading of the digital medical images.

35. The system as set forth in claim 34, wherein the pricing information includes a schedule of fees for the reading of different types of the digital medical images.

37. The system as set forth in claim 34, wherein the pricing information includes:

a schedule of fees for the reading of different types of the digital medical images; and

a listing of the fees charged by different ones of the diagnostic service providers.

38. A method for facilitating remote reading of medical images, including the steps of:

converting a plurality of physical medical images for respective patients into corresponding digital medical images;

storing the digital medical images in a remotely accessible data storage device, to thereby provide a remotely accessible electronic digital medical image database

comprised of the stored digital medical images;

providing a pool of participating diagnostic service providers with access to the electronic digital medical image database; and

wherein any one or more of the diagnostic service providers can select one or more of the digital medical images from the database for reading, in accordance with selection criteria established by the diagnostic service providers and the patients.

39. The method as set forth in claim 38, wherein any one or more of the diagnostic service providers can select one or more of the digital medical images from the database for reading any time which they choose.

40. The method as set forth in claim 38, wherein any one or more of the diagnostic service providers selects one or more of the digital medical images from the database during their normal downtime.

41. The method as set forth in claim 38, further including the step of the participating diagnostic service providers competitively bidding for the right to read one or more of the digital medical images from the database.

42. The method as set forth in claim 38, further including the step of the participating diagnostic service providers and the patients engaging in an interactive bidding process regarding the fees to be charged by the participating diagnostic service providers for the reading of one or more of the digital medical images from the database.

44. The method as set forth in claim 38, further including the step of providing the patients access to pricing information for the reading of the digital medical images.

45. The method as set forth in claim 44, wherein the pricing information includes a schedule of fees for the reading of different types of the digital medical images.

47. The method as set forth in claim 44, wherein the pricing information includes:

a schedule of fees for the reading of different types of the digital medical images ; and

a listing of the fees charged by different ones of the participating diagnostic service providers.

48. A method for operating a computer system including a buffer memory storing a plurality of electronic medical by diagnosis by a diagnostic physician, each of the electronic medical images having an associated priority indicia assigned by a respective user, said method comprising steps for:

monitoring a rate of change of position of the patient's electronic medical image relative to the plurality of electronic medical images;

estimating a velocity through the buffer memory to the diagnostic physician; and

when said velocity is unacceptable to the patient, changing the priority indicia in the patient's electronic medical image so as to instruct the computer system to reorder the plurality of electronic medical images based on the priority indicia and thereby increase the velocity of the patient's electronic medical image.

50. The method as recited in claim 48, further comprising the step for downloading the one of the electronic medical images having the highest priority to the diagnostic physician.

WEST

Help | Logout | Interrupt

Main Menu | Search Form | Posting Counts | Show S Numbers | Edit S Numbers | Preferences | Cases

Search Results -

Term	Documents
DATABASE	61445
DATABASIS	0
DATABASES	21625
IMAGE	409083
IMAGES	201966
(8 AND (DATABASE NEAR IMAGE)).USPT.	8
(L8 AND (DATABASE NEAR IMAGE)).USPT.	8

Database: US Patents Full-Text Database
US Pre-Grant Publication Full-Text Database
JPO Abstracts Database
EPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L9

Refine Search

Recall Text | Clear

Search History

DATE: Friday, July 11, 2003 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=YES; OP=OR			
L9	L8 and (database near image)	8	L9
L8	L7 and (image near information)	21	L8
L7	L6 and criteria	48	L7
L6	L5 and (server$)	104	L6
L5	L1 and search$	498	L5
L4	L3 and image	2	L4
L3	L2 and (image near information)	2	L3
L2	L1 and (search$ near condition)	3	L2
L1	medical near image	2006	L1

END OF SEARCH HISTORY

WEST

Help | Logout | Interrupt

Main Menu | Search Form | Posting Counts | Show S Numbers | Edit S Numbers | Preferences | Cases

Search Results -

Term	Documents
DATABASE	61445
DATABASIS	0
DATABASES	21625
IMAGE	409083
IMAGES	201966
(8 AND (DATABASE NEAR IMAGE)).USPT.	8
(L8 AND (DATABASE NEAR IMAGE)).USPT.	8

Database: US Patents Full-Text Database
US Pre-Grant Publication Full-Text Database
JPO Abstracts Database
EPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L9

Refine Search

Recall Text | Clear

Search History

DATE: Friday, July 11, 2003 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=YES; OP=OR			
L9	L8 and (database near image)	8	L9
L8	L7 and (image near information)	21	L8
L7	L6 and criteria	48	L7
L6	L5 and (server$)	104	L6
L5	L1 and search$	498	L5
L4	L3 and image	2	L4
L3	L2 and (image near information)	2	L3
L2	L1 and (search$ near condition)	3	L2
L1	medical near image	2006	L1

END OF SEARCH HISTORY

WEST

Collections

Definition, Editing, Browsing

Name: Undefined

Contents:

```
5911687
6006191
6574742
```

Comment:

Database:

- US Patents Full-Text Database
- US Patents Pre-Grant Publication Full-Text Database
- JPO Abstracts Database
- EPO Abstracts Database
- Derwent World Patents Index
- IBM Technical Disclosure Bulletins

Save | Save As | Help | Reset | Quit

Print | Search | Get Images | Classification Info

Main Menu | Collection Directory

Logout